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DENSE FAULT ZONES

Utah's Wasatch Front: Another Managua?

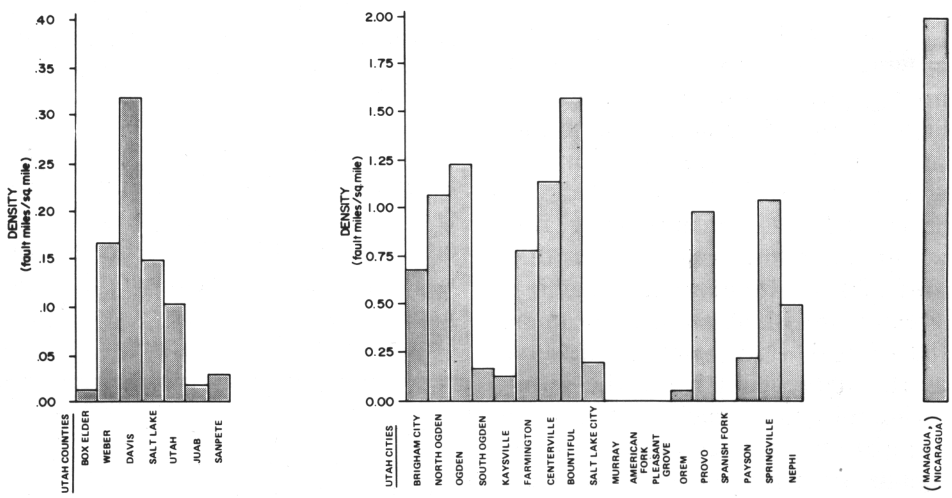
Bruce N. Kaliser, Chief, Urban and Engineering Geology Section, Utah Geological and Mineral Survey, presented his findings of a Wasatch Fault zone statistical study at the 12th Annual Symposium on Engineering Geology and Soils Engineering held in Boise, Idaho, the week of April 1, 1974. His paper, entitled "The December, 1972, Managua Earthquake–Lessons for Utah's Wasatch Front," compared earthquake fault densities of counties and cities along Utah's Wasatch Front with Managua, Nicaragua, and discussed factors of earthquake associated damage by strong ground shaking and ground failure–landsliding, liquifying earth, ground subsidence and spreading, etc.

Mr. Kaliser visited Managua, Nicaragua, in January, 1974, at which time he discussed the plight of the capital city with Nicaraguan officials including chief-of-state, General Anastasio Somoza. The Managua earthquake involved five major faults, totaling some 10 miles in length, which broke the surface and moved the central city area. Population of Managua at the time was approximately 450,000 people.

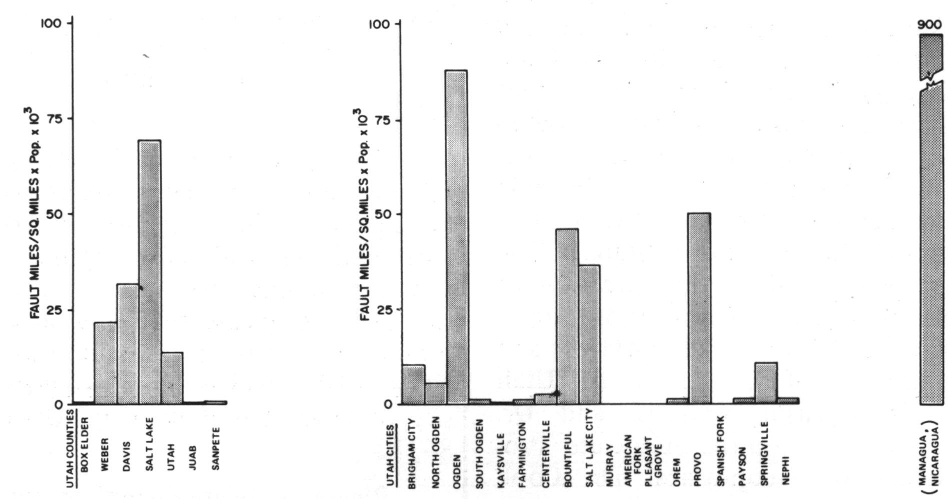
Using Utah Geological and Mineral Survey's low sun-angle aerial photography of the Wasatch Front area, a statistical study was performed on surface traces judged to have been faults which broke the ground surface in recent geologic time. The density of faulting among counties on the Wasatch Front is such that there is great potential hazard for future earthquake activity.

Some 81% of Utah's population resides in or along the Wasatch Fault zone. Davis County, experiencing the fastest population growth in the State, ironically has the highest fault density, twice as high as the next highest county. Bountiful and Centerville in the

(continued on page 8)



Earthquake fault densities in Utah counties and cities, Wasatch Fault zone (compiled from low sun-angle vertical aerial photography).



Earthquake fault densities for Utah counties and cities, weighted for population (compiled from low sun-angle vertical aerial photography and 1970 U. S. Census figures).

Earthquake Monitoring System

SEISMOGRAPH NETWORK EXPANDED

A major expansion of Utah's sparse network of seismograph stations will be launched by University of Utah scientists under a three-fold program to reduce earthquake hazards. The present network of 9 monitoring stations will be increased to approximately 50 stations and the highly sensitive equipment to be installed will give the State one of the most sophisticated systems in the nation. One of the major goals of the project is development of an earthquake prediction capability, according to Dr. Stanley H. Ward, Professor and Chairman of the Department of Geology and Geophysics.

Signals from each of the seismograph stations will be transmitted by radio and telephone lines to the Mineral Science Building on the University campus, where they will be recorded and developed on 16 millimeter film within 12 minutes. Four recording and film developing machines already are in place in a room on the seventh floor, which will serve as the nerve center for the monitoring program. Each unit has the capability of recording seismic signals from 16 separate stations. The signals will be beamed from the various field stations to a 30-foot antenna on the roof of the Mineral Science Building and fed into the recording units, which are equipped with viewer screens that have an "instant replay" capability. "At this one location," Dr. Ward explained, "we will be able to continuously take the seismic pulse of the entire State." The project is under the direction of Dr. Kenneth L. Cook, Professor of Geology and Geophysics and Director of University of Utah Seismograph Stations, and Dr. Robert B. Smith, Associate Professor of Geophysics. Dr. Cook estimates the project will take two years to complete. Some of the new stations, he said, will be located in remote areas. About 24 of them will be placed along the Wasatch Front to assist in research on quake predictions. Approximately 10 others will be scattered throughout the State to study the mechanics of earthquakes.

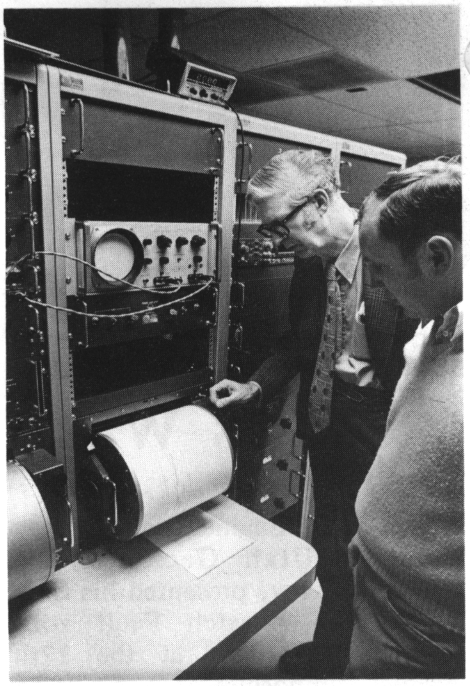
"The overall aspect of the new stations is to appraise the earthquake hazards along various fault zones in Utah," said Dr. Cook. "In particular, we want to determine more accurately where the earth movement is taking place. Pinpointing the seismic activity and the faults themselves will provide knowledge for an accurate assessment of the earthquake hazards along the Wasatch Fault."

Dr. Cook said the University is already receiving radio telemetry from two seismograph stations, one in the LDS Church records vault in Little Cottonwood Canyon and the other atop West Mountain near Utah Lake.

The UGMS is attempting to compile a collection of as many mining and oil property maps as possible. The maps will be kept on file in the Survey building to provide information on claims and leases of mineral deposits as well as portraying the historical development of mineral industries in the State.

We would appreciate receiving mining and oil property maps to be added to the collection. If so requested, we will copy the maps and return the originals. If you can help us, please send any such maps in your possession to: UGMS, 103 UGS Building, University of Utah, Salt Lake City, Utah 84112.

Please indicate whether we may keep the original.



Drs. Kenneth L. Cook (left) and Robert B. Smith examine seismograph signals.

Another capability of the network pertains to the potential hazards in connection with the development of geothermal energy, which involves the drilling of holes to tap hot water and steam as energy sources. The University seismologists say they expect the expanded network will help show to what extent future geothermal development in Utah might cause induced earthquakes.

The biggest challenge facing the scientists in the new undertaking is developing an earthquake prediction capability. Part of the research in this area will involve detailed monitoring of man-made blasts to detect any changes in the velocity of "P" waves, the first to arrive at seismic stations following a blast. It is believed P-waves travel more slowly just before a quake because of a buildup in rock pressure. This buildup in pressure causes the rocks to expand and produces microcracks. The microcracks, in turn, decrease the velocity of the P-waves. "If the decrease in rock velocity can be measured preceding an earthquake, it may be a method of earthquake prediction," Dr. Smith explained.

At Home With Geology

BE SURE BEFORE YOU BUILD

by B. N. Kaliser
UGMS Engineering Geologist

Homebuyers in many of Utah's metropolitan areas must regard evidence of ground breakage indicating the presence of a possible fault as a threat to any structure placed on the site. Cracks in the earth's crust which reach the surface normally displace the ground from a few inches to several feet during an earthquake. In Utah the displacement is usually in a vertical direction. The fractures may comprise a complex system in a zone a few feet to more than a mile in width. Once established these fractures remain as planes or surfaces of weakness along which additional movement may be expected during earthquake episodes in the future. It is most imprudent to plan any structures, including houses, across a fault trace.

Faults which break the surface leave a short, steep slope and normally affect surface drainage. Geologists look for a number of geomorphological features to determine whether a break-in-slope is due to faulting or some other phenomena. Grading operations undertaken by developers to construct lots obscure such surface features, but if cut slopes are made it is possible to inspect a cross-section of the site for evidence of faulting. Before making a fault determination the engineering geologist excavates a trench to observe the earth material *in situ*. If a fault trace is detected he can then give a set-back distance for placement of a structure.

The density of faulting is generally high along Utah's Wasatch Front (see article appearing on pages 1 and 8, this issue). Metropolitan areas experiencing growth eastward are encroaching on the fault zone. Maps showing faults, available through the County or City Planning Office or UGMS, are not the final word. Undoubtedly other faults than those known exist.

HISTORIC EVENT

Great Salt Lake Decides Issue

On March 29, 1974, a small group of Federal and State officials, including Attorney General Vernon Romney, Assistant Attorney General Paul E. Reimann, and Director Charles Hansen of the Division of State Lands, gathered on the south shore of the Great Salt Lake to observe a unique and historic event. The level of the lake stood at 4,200.8 feet, exactly the same as it was when Utah attained Statehood in 1896.

Checking the lake level. Members of the party facing the camera are (from left to right): C. Hansen, P. Riemann, C. Stowe, V. Romney and T. Arnow.

Both Mr. Reimann and Mr. Hansen were involved in litigation with the Federal Government over ownership of the land exposed when the lake level was below the Statehood figure—the "relicted lands" issue. The previous week the U. S. Supreme Court received an opinion from Judge Charles Fahy, Senior Judge of the U. S. Court of Appeals, District of Columbia, who was acting as Special Master of the Court. His opinion stated the exposed lands should belong to the State, and it is expected the Supreme Court will concur with his recommendation. In the meantime, the natural course of events has rendered the controversy academic; the lake has been steadily rising since its historic low level (4,191.35 feet, October, 1964) and has now gained 9.45 feet, completely covering the relicted lands.

After ceremonies at the gauge, the group was invited aboard the Utah Geological Survey's research craft, the Gilbert, for a short trip on the lake to observe the water rippling against rocky promontories where brass-capped monuments mark the 4,200.8 level.

Do You Like Us?

The UGMS is reviewing and updating the *Quarterly Review* mailing list. If you wish to continue receiving the *Quarterly Review*, would you please help us by filling out and returning this questionnaire. Otherwise, your name will automatically be deleted from our mailing list.

Utah Geological and Mineral Survey
103 UGS Building
University of Utah
Salt Lake City, Utah 84112

I wish to continue receiving the UGMS *Quarterly Review*. My correct address is:

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Signature ____________________________

Utah Mineral Production–1972

compiled by Carlton H. Stowe
UGMS Minerals Information Specialist

Mineral production and values for 1972 are compiled from various tabulations of the U. S. Bureau of Mines. Oil and gas data is from Division of Oil and Gas Conservation, State of Utah. For a comparison with 1971 figures, see February and May 1973 *Quarterly Review*.

Commodity	Quantity	Value
BEAVER COUNTY		
Copper	5,903,672 lbs	$ 3,022,680
Perlite	W	W
Pumice	1,700 s. t.	3,400
Sand and gravel	W	W
Sulfur ore	W	W
Tungsten ore	W	W
TOTAL		$ 3,026,106
BOX ELDER COUNTY		
Lime	W	W
Limestone	W	W
Salt	23,700 s. t.	$ 190,000
Sand and gravel	637,000 s. t.	472,000
Stone, crushed	W	W
Tungsten ore	W	W
TOTAL		$ 1,782,057
CACHE COUNTY		
Lime	W	W
Limestone	W	W
Sand and gravel	501,000 s. t.	$ 590,000
Stone, crushed	W	W
TOTAL		$ 2,000,012
CARBON COUNTY		
Asphalt sand and rock	W	W
Carbon dioxide	W	W
Coal	3,636,338 s. t.	W
Natural gas	486,067 MCF	$ 82,363
Sand and gravel	W	W
TOTAL		W
DAGGETT COUNTY		
Natural gas	2,794,236 MCF	$ 363,240
Petroleum	7,196 bbls	10,396
Sand and gravel	W	W
Stone	W	W
TOTAL		$ 969,636
DAVIS COUNTY		
Sand and gravel	1,756,000 s. t.	$ 1,472,000
Stone–quartzite	26,130 s. t.	25,929
TOTAL		$ 1,728,309
DUCHESNE COUNTY		
Gilsonite	W	W
Natural gas	6,106,989 MCF	$ 72,965
Petroleum	5,892,623 bbls	14,655,953
Sand and gravel	108,000 s. t.	123,000
Stone	W	W
TOTAL		$ 14,851,918
EMERY COUNTY		
Coal	942,822 s. t.	W
Natural gas	511,483 MCF	$ 44,992
Petroleum	3,453 bbls	9,674
Sand and gravel	W	W
Uranium	W	W
Vanadium	W	W
TOTAL		W
GARFIELD COUNTY		
Petroleum	2,614,328 bbls	$ 6,160,261
Sand and gravel	W	
Uranium	W	
Vanadium	W	
TOTAL		$ 6,160,291
GRAND COUNTY		
Asphalt rock	W	W
Natural gas	8,767,261 MCF	$ 967,953
Petroleum	97,581 bbls	277,300
Potassium salts	W	W
Sand and gravel	W	W
Uranium	W	W
Vanadium	W	W
TOTAL		$ 4,678,514
IRON COUNTY		
Coal	W	W
Gypsum	W	W
Iron ore	W	W
Limestone	W	W
Pumice	3,400 s. t.	$ 10,200
Sand and gravel	W	W
Stone	W	W
TOTAL		$ 8,680,409
JUAB COUNTY		
Beryllium ore	W	W
Copper	W	W
Fluorspar	W	W
Gold	W	W
Kaolin	W	W
Lead	W	W
Limestone	W	W
Sand and gravel	47,000 s. t.	$ 31,000
Silver	W	W
Stone, crushed	2,813 s. t.	10,548
Zinc	W	W
TOTAL		$ 115,161
KANE COUNTY		
Coal	W	W
Pumice	5,815 s. t.	$ 9,110
Sand and gravel	W	W
TOTAL		W
MILLARD COUNTY		
Fluorspar	W	W
Pumice	W	W
Sand and gravel	W	W
Tungsten ore	500 s. t.	W
TOTAL		W
MORGAN COUNTY		
Cement, masonry and portland	W	W
Limestone	W	W
Phosphate rock	W	W
Sand and gravel	W	W
Stone, sandstone	27,300 s. t.	$ 27,090
TOTAL		$ 1,132,919
PIUTE COUNTY		
Alunite		
Clays		
Fire clay	150 s. t.	$ 150
Sand and gravel	1,000 s. t.	2,000
Uranium		
TOTAL		W
RICH COUNTY		
Gravel	W	W
Phosphate rock	W	W

(continued on next page)

(continued from page 4)

Commodity	Quantity	Value
Stone, crushed	560 s. t.	$ 1,400
TOTAL		W
SALT LAKE COUNTY		
Barite	W	W
Cement, portland	W	W
Clays	W	W
Copper	502,880,896 lbs	$257,475,019
Gold	314,101 t. o.	18,406,318
Lead	W	W
Lime	25,615 s. t.	771,625
Molybdenum	W	W
Perlite	W	W
Salt	W	W
Sand and gravel	4,610,000 s. t.	4,441,000
Silver	2,661,453 t. o.	4,484,549
Stone, quartzite	W	18,750
Vermiculite	W	W
TOTAL		$301,693,075
SAN JUAN COUNTY		
Copper	7,382,736 lbs	$ 3,779,961
Natural gas	38,680,043 MCF	1,876,846
Petroleum	11,345,630 bbls	37,012,130
Sand and gravel	W	W
Silver	W	W
Uranium	W	W
Vanadium	W	W
TOTAL		$ 51,655,355
SANPETE COUNTY		
Bentonite	2,620 s. t.	$ 17,960
Clays	W	W
Salt	W	W
Sand and gravel	W	W
TOTAL		$ 65,754
SEVIER COUNTY		
Bentonite	1,394 s. t.	$ 25,843
Clay and shale	W	W
Coal	184,023 s. t.	W
Fullers earth	2,080 s. t.	41,857
Gypsum	W	W
Perlite	W	W
Salt	8,000 s. t.	40,000
Sand and gravel	W	W
TOTAL		W
SUMMIT COUNTY		
Clay and shale	W	W
Coal	38,817 s. t.	W
Copper	W	W
Gold	W	W
Lead	W	W
Natural gas	2,130,963 MCF	
Petroleum	1,165,630 bbls	$ 4,116,459
Pyrite	W	W
Sand and gravel	W	W
Silver	W	W
Stone, crushed	27,300 s. t.	27,090
Zinc	W	W
TOTAL		W
TOOELE COUNTY		
Calcite	W	W
Clay and shale	W	W
Copper	W	W
Gold	W	W
Lead	W	W
Lime	W	W
Limestone	W	W
Magnesium compounds	W	W
Marble	W	W
Potassium salts	W	W
Pumice	W	W
Salt	W	W
Sand and gravel	W	W
Silver	W	W
Stone (limestone, dolomite, marble)	W	W

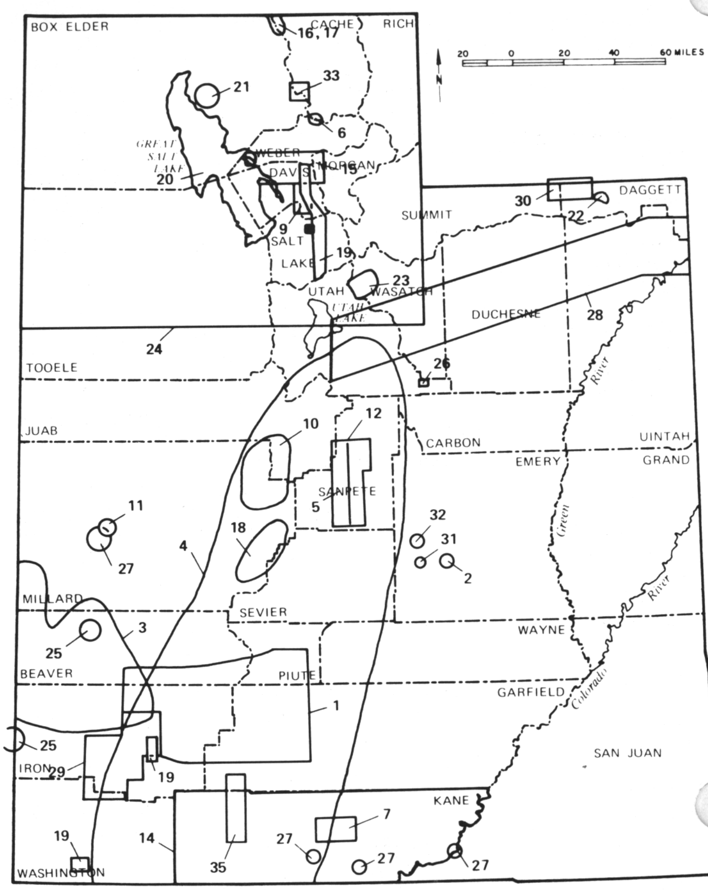
Commodity	Quantity	Value
Tungsten ore	W	W
Zinc	W	W
TOTAL		$ 8,065,491
UINTAH COUNTY		
Asphalt rock	W	W
Gilsonite	W	W
Natural gas	14,710,560 MCF	$ 2,579,926
Petroleum	5,443,755 bbls	16,034,271
Phosphate rock	W	W
Sand and gravel	272,000 s. t.	W
Stone, crushed	W	W
TOTAL		$ 18,714,495
UTAH COUNTY		
Clay and shale	W	W
Fire clay	1,464 s. t.	$ 6,590
Copper	101,214 lbs	51,822
Gold	398 t. o.	23,322
Kaolin	W	W
Lead	34,350,091 lbs	5,162,819
Lime	W	W
Manganiferous ore	W	W
Marble	W	W
Ozokerite	W	W
Sand and gravel	1,102,000 s. t.	1,564,000
Silver	1,018,127 t. o.	1,715,545
Stone (limestone, dolomite)	W	W
Zinc	42,527,511 lbs	7,548,633
TOTAL		$ 18,476,981
WASATCH COUNTY		
Copper	2,745,986 lbs	$ 1,405,945
Gold	47,914 t. o.	2,807.761
Lead	7,062,716 lbs	1,061,526
Ozokerite	W	W
Sand and gravel	W	W
Silver	620,024 t. o.	1,044,740
Stone, crushed	W	W
Zinc	1,179,197 lbs	209,308
TOTAL		$ 6,912,421
WASHINGTON COUNTY		
Pumice	W	W
Sand and gravel	W	W
Stone, dimension	W	W
TOTAL		W
WAYNE COUNTY		
Sand and gravel	W	W
Uranium	W	W
Vanadium	W	W
TOTAL		W
WEBER COUNTY		
Clay and shale	W	W
Magnesium compounds	W	W
Potassium salts	W	W
Salt	W	W
Sand and gravel	225,000 s. t.	$ 225,000
Sodium sulfate	W	W
TOTAL		$ 2,865,860
UNDISTRIBUTED CATEGORIES		$ 27,453,406
UNDISCLOSED VALUES		$ 57,391,000
GRAND TOTAL		$542,809,000

W = Withheld by USBM to avoid disclosing individual company confidential data. Where possible, values are included in county totals. Otherwise, values are included in "Undistributed." County totals that have been withheld to avoid disclosing individual company confidential data are included with "Undistributed." "Undisclosed Values" are those commodities regularly withheld by USBM.

s. t. = short tons.
MCF = million cubic feet.
bbls = barrels.
lbs = pounds.
t. o. = troy ounces.

SUMMER FIELD WORK IN UTAH

The geologists who plan to work in Utah during the 1974 field season are listed below. The reference numbers in the left column correspond as far as possible with the location numbers on the accompanying map.



1 Anderson, J. J. Kent State Univ.	Geology of southwest High Plateaus, Black Mountains.
2 Bagshaw, L. H. Brigham Young Univ.	Paleoecology of the Carmel Formation.
3 Best, M. G. Brigham Young Univ.	Regional geology of mid-Tertiary volcanic rocks, southwestern Utah.
4 Best, M. G. and W. K. Hamblin Brigham Young Univ.	Tectonic evolution of the eastern margin, Basin and Range Province.
5 Birsa, D. S. Ohio State Univ.	The North Horn Formation, central Utah: sedimentary facies and petrography.
6 Blau, J. G. Utah State Univ.	Geology of southern part of James Peak quadrangle, Cache County.
7 Bowers, W. E. USGS	Geologic mapping in western Kaiparowits region.
8 Butkus, T. Univ. of Utah	Ochre Mountain Limestone in Tintic Mountains.
9 Callaghan, E., N. S. Goeltz and C. Mann UGMS	Salient study on the Great Salt Lake.
10 Campbell, J. A. Univ. of Utah	Geomorphology and neogene structural development of the Canyon Range, central Utah.
11 Church, S. B. Brigham Young Univ.	Lower Ordovician patch reefs, western Utah.
12 Collinson, J. W., C. E. Corbató, D. H. Eliot and M. P. Weiss Ohio State Univ.	Geology of the Wales, Ephraim, Manti and Sterling quadrangles, central Utah.
13 DeGraff, J. V. Utah State Univ.	Geomorphology of canyons of Bear River Range.
14 Doelling, H. H. UGMS	Geology and mineral resources of Kane County.
15 Goeltz, N. S. UGMS	Geologic atlas of land and water use.
16 Gray, W. E. Utah State Univ.	Structural geology of the south part of Clarkston Mountain, Malad Range, Utah-Idaho.
17 Hardy, C. T. Utah State Univ.	(a) Structural geology of James Peak quadrangle, Cache County; (b) Structural geology of Malad and Bannock Ranges, Utah-Idaho.
18 Hickcox, C. W. Univ. of Fla.	(a) Evolution of the southwestern border of the Pavant Range; (b) Middle and Upper Cambrian stratigraphy.
19 Kaliser, B. N. UGMS	(a) Wasatch Front studies in the urban environment; (b) Cedar City area engineering geology; (c) St. George area engineering geology.
20 Katzenberger, W. UGMS	Bottom study, of the Great Salt Lake: sediments, contours and currents.
21 Kohler, J. F. Utah State Univ.	Morphology, sediment distribution and geochemistry of relict lake-margin deposits in the Rozel Flats area, north Utah.
22 Lowrey, R. O. Brigham Young Univ.	Paleoenvironment of the Carmel Formation.
23 Newman, D. H. Brigham Young Univ.	Paleoenvironment of the lower Triassic Thaynes Limestone, Wasatch County.
24 Oaks, R. Q., Jr. and R. R. Alexander Utah State Univ.	Depositional environments and stratigraphy of Middle and Upper Cambrian units of north Utah and south Idaho.
25 Perry, L. UGMS	(a) Detail mapping and mine evaluation in Gold Springs and Pine Grove Mining Districts, southwest Utah; (b) Geologic mapping of mines in Pilot Range, Box Elder County.
26 Peterson, A. R. Brigham Young Univ.	Sedimentary environment of the Colton Formation.
27 Rigby, J. K. Brigham Young Univ.	Paleoecologic models of: (a) Southern House Range-Confusion Range; (b) Canyonlands near Moab; (c) Lake Powell to Kaibab Monocline.
28 Ritzma, H. R. UGMS	Lineament and fracture study, northeastern Utah.
29 Rowley, P. D. Kent State Univ.	Geology of the Iron Springs Mining District.
30 Schell, E. M. USGS	Geology of the Jessen Butte, Phil Pico Mt. and Hoap Lake quadrangles.
31 Smith, L. S. Brigham Young Univ.	Paleoenvironment of the Jurassic Upper Entrada and Curtis Formations.
32 Stanton, R. G. Brigham Young Univ.	Paleoecology of the Summerville Formation.
33 Summers, P. L. Utah State Univ.	Surficial geology of intermontane valleys, Mount Pisgah quadrangle, Cache County.
34 Wakeley, L. D.	Environmental interpretation of the Nounan Formation and the Worm Creek Member of the St. Charles Formation, southeast Idaho.
35 Zeller, H. P. and F. Peterson USGS	Geologic mapping in eastern Kaiparowits region.

New Law Helps Protect Homebuyers

The Utah Legislature passed the Utah Uniform Land Sales Practices Act in its last regular session. The act took effect August 1, 1973.

Bruce N. Kaliser, Chief, Utah Geological and Mineral Survey, Urban and Engineering Geology Section, was asked to cooperate with Wendell H. Paulsen, Real Estate Division Director, State Department of Business Regulation (retired April, 1974), in establishing rules and regulations to implement the act. For the past six years UGMS has kept the State Division of Real Estate advised on physical terrain problems connected with individual subdivision inspections which have been performed for the Agency of Environmental Health and the Contractor's Division.

Primary purpose of the act is to provide for the registration of subdivisions and subdivided lands in the State. Intent of the act matches that of the Federal Interstate Land Sales Full Disclosure Act. Rules and regulations for the federal act were developed by the Department of Housing and Urban Development (published in the *Federal Register*, volume 37, no. 18, Jan. 27, 1972). The federal act became law on April 28, 1969.

Section 7 of the Utah act declares that "every public offering statement shall disclose fully and accurately the physical characteristics of the subdivided lands offered and shall make known to property purchasers all unusual and material circumstances or features affecting the subdivided land."

In conformance with Section 7 Mr. Kaliser submitted the following format for Part IV of the disclosure statement. An asterisk denotes those phrases or paragraphs which differ from the federal act.

A. Legal description. Include an adequate legal description acceptable in the political subdivision for conveyancing of the land included in this offering; and if additional offerings have been made or will be made pursuant to a common promotional plan, include a legal description of the total area offered or to be offered pursuant to the common promotional plan.

B. Topography

1. State elevation of the highest and lowest lots in the subdivision.

*2. State highest elevation of presently existing access road over which travel is requisite to reach the subdivision.

*C. Terrain and geologic conditions

1. Describe the type of terrain and physical characteristics of the subdivision—for example, level, hilly, rocky, etc.; earth and soil conditions—for example, loose sand, alkaline, etc.

2. State whether any of the lots or portions thereof in the offering are covered by water at any time during the year, *or have a historic record of being covered.

*3. State the depth to ground water (water table), both perched and permanent. Show location of springs and seepage areas on the subdivision, and indicate presence of same for a 1,000-ft. radius around subdivision.

4. State whether the subdivision is subject to floods, violent winds, earthquakes, brushfires, forest fires, avalanches, or other natural hazards, or unusual geologic phenomena. The existence, severity and frequency of natural hazards should be fully explained. If any of the natural hazards of the type illustrated in this paragraph are present, state whether the area in which the subdivision is located has been formally identified by any Federal, State, or local agency as being in an area subject to a special natural hazard and whether the area is or will be subject to any special land use requirements which will restrict development or entail unusual development or maintenance expense. *The lack of identification by said agencies does not imply nonexistence of hazardous conditions.

5. Is any part of the subdivision subject to any type of flood control easement?

*6. Are there any adverse foundation conditions that require special attention (saturated soils, loose or wind blown sand or silt, collapsible soil, etc.)?

*7. Does ledge rock outcrop or come close to the ground surface?

*8. What is erosion potential of the soil?

*9. Is there any evidence of slope instability or ancient landslides on the subdivision? Have rocks fallen on the subdivision from ledgerock above?

10. What percentage of the land will require fill before construction? If any, describe plans for fill, including composition and estimated cost to lot buyer or lessee.

11. What percentage of the land in the subdivision will require corrective work, other than fill, before construction of a one-story residential structure? If any, describe type of work and plans for correction; and state the estimated cost to buyer or lessee. *Will retaining walls be necessary?

*12. Are earthquake faults in evidence on or suspected within 100 yards of the subdivision?

*13. State whether a geologic and/or soils map is being provided. If so, it would be preferable to show springs, seepage areas, geologic

(continued on page 8)

SLC HOSTS GATHERING

First Conference on Basement Tectonics

Salt Lake City was chosen for an International Conference on the New Basement Tectonics June 3-7, 1974. The conference is the first gathering of earth scientists devoted exclusively to the study of geological lineaments (character features of local or regional proportions) on the earth's surface.

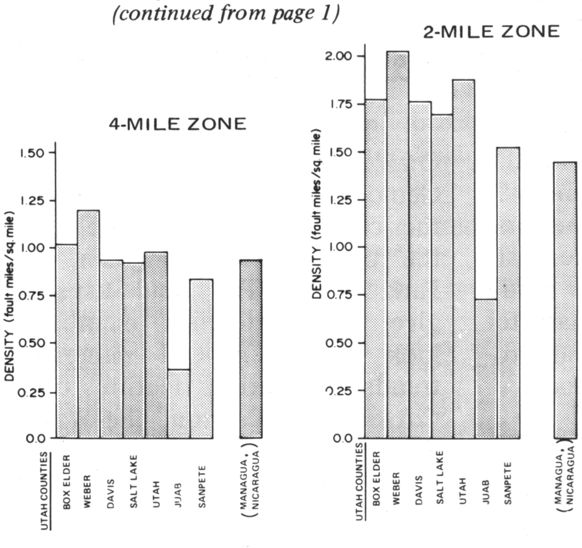
The conference will include four days' presentation of papers—Monday, June 3, through Thursday, June 6, 1974. Forty-seven titles have been submitted by scientists from several countries; several cover areas outside the United States. Papers will be presented by authors from Canada, U. S. S. R., Australia, Poland, England, Czechoslovakia, Germany, France, South Africa and the United States.

Two field trips are planned. One will take in the "General Geology of the Wasatch Front," the other "Economic Geology of the Uinta Trend: Bingham, Alta, Park City." The field trips will give the conference members a look at the general mineralized trends and various features of Big Cottonwood Canyon, the Wasatch Range, the Alta Mining District, and Snowbird and Park City ski areas.

Meetings are to be held at the Tri-Arc Travelodge. The Utah Geological Association is sponsoring the International Conference in cooperation with the National Aeronautics and Space Administration and the U. S. Geological Survey.

UTAH'S WASATCH FRONT

(continued from page 1)



Earthquake fault densities in Utah counties within 4- and 2-mile zones of the break-in-slope in the Wasatch Fault zone (compiled from low sun-angle vertical aerial photography).

Davis County maximum growth area both have high fault densities for cities with more than 2,500 population. Managua's fault density only slightly exceeds that of Utah's cities. There is a maximum hazard to personal safety from ground surface rupturing in both counties and cities where population is maximal (note graph showing weighted density of population). Ground surface rupturing in an urban environment results in multiple severing of gas, water, electricity, and communication lines and transportation systems. Structures placed astride traces of faults that may experience renewed movement are totally destroyed.

Two- and four-mile wide belts in the study areas were drawn to compare densities within these concentrated belts. For the two-mile wide belt, a density of about 1¾ miles of faults per square mile is average and about 1 mile of faults per square mile is average for the four-mile wide belt. Six of seven counties in both the two-mile and four-mile wide belts equal or exceed the density of faulting in Managua. Mr. Kaliser concludes: "With increased urbanization encroaching to a greater extent upon the Wasatch Fault zone, there is every need for city and county officials to give the matter its due consideration in planning and zoning."

For additional information and/or comments, Bruce Kaliser may be contacted at the Utah Geological and Mineral Survey; phone 581-6831, or write 103 UGS Building, University of Utah, Salt Lake City, Utah 84112.

LAW PROTECTS HOMEBUYERS

(continued from page 7)

material type, drainages, geologic faults, landslides and other relevant factors on such a map.

*14. Give dimensions of maximum cuts and fills required in construction of roads and building lots.

Applications for registration are to be accompanied by a filing fee of $75 plus an additional $1 for each unit and a deposit of $300 to cover all examination costs and expenses incurred by the State. Any portion of the $300 not used is refunded together with an itemized statement from the Real Estate Division of expenditures. UGMS strongly concurs that it is equitable for the State to charge for field inspections conducted by its Urban and Engineering Geology Division on behalf of the State to cover professional fees and expenses of transport and *per diem* encountered by the examiner.

QUARTERLY REVIEW

State of Utah .... *Calvin L. Rampton, Governor*

Department of Natural Resources .... *Gordon E. Harmston, Executive Director*

Utah Geological and Mineral Survey .... *Donald T. McMillan, Director*

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